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ABSTRACT

Academic achievement of fifth grade students, statistically controlled for the student's socioeconomic status, was studied in relationship to the racial balance of the student's school. Eleven elementary schools were assigned to three categories in which the percentage of students who were black was either 11 to 15, 22 to 24, or 47 to 51%. Categories of students according to race, sex, or both were then compared across school racial-balance categories with respect to adjusted mean achievement test scores when the scores were adjusted for socioeconomic level. Black student achievement, in general, appeared to be negatively related to proportion of black students in each school category; but the effects were confounded by several additional considerations. The major portion of the difference was accounted for by black males. Also, the largest differences tended to be between schools in the 11 to 15 percent black category and the other two categories. It is suggested that differences in curriculum, attitudes, and school climate may be more important determiners of student achievement than race and sex, which were studied in this research. (Author/CTM)

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ANN ARBOR PUBLIC SCHOOLS

FINAL REPORT

A Study of Student Achievement Involving the Consideration of Racial and Socioeconomic Characteristics

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Thanks are due to many persons who read drafts, offered suggestions, and maintained confidence. Initially an informal group of Ann Arbor Public Schools' personnel served as a reaction panel and offered feedback as the proposal was written. Elementary principals were primary data collectors. Personal and professional friends of the authors at Wayne State University, The University of Alabama in Birmingham, Western Michigan University, Michigan State University, and the University of Michigan, especially in the Departments of Psychology and Sociology, provided untold hours of invaluable consultation. Without the collective assistance of all of the aforementioned persons the project literally would not have been possible.

In addition, the Director of Research and Evaluation would like to formally acknowledge the contributions of the Associate Superintendent for Curriculum and Instruction of the Ann Arbor Public Schools. His expressions of confidence and patience, as well as technical assistance and advice as the research team worked through conceptual problems, made possible sometimes slow but steady progress.

INTRODUCTION

The total school environment as it affects the learning/achievement process of students is a concern for all involved in the educational community. This environment is obviously multi-dimensional. Within this complex framework, this study is directed toward varying achievement rates and their relationships to the racial composition of the environment. The primary research question is as follows: "Do students in racially impacted schools in Ann Arbor achieve at varying rates from students in schools which are not racially impacted when socioeconomic status is a controlled variable?" More specifically, the investigation will consider the question for minority students, majority students, and the group as a whole.

The study has been initiated by the Ann Arbor Board of Education following a review of test data which indicated that schools with high minority student populations and also a high percentage of low-income families tended to record relatively low mean achievement values. These data and resulting observations were drawn from the administration of the California Achievement Test (1970 edition) to all third, fifth, eighth, and tenth graders in the fall of 1976.

Two methodological approaches, cross-sectional and before-after integration studies, have been used in past research to investigate this problem. Cross-sectional studies have compared children from schools differing in racial composition. These studies have a disadvantage in that these groups of children may not be equated on a number of factors such as socioeconomic status and initial ability.

The most famous and comprehensive of the cross-sectional studies is the Office of Education study headed by James Coleman (Coleman, Campbell,

Hobson, McPartland, Mood, Weinfeld, and York, 1966) which compared verbal achievement in schools throughout the nation. The data analyses from this study indicated that minority achievement tended to be lower in classes with a majority of black students than in classes where the racial composition was primarily white.

Several of the pre-post integration studies have been cross-sectional in design. That is, the same students were not compared before and after integration, but rather two different groups of students were compared -- one group in which achievement was assessed before integration and one in which achievement was assessed after integration. Several studies of this nature (Justin and Thabit, 1974; Singer, 1970) found that the performance of neither whites nor minorities changed a statistically significant amount following integration. However, the post-integration measures of achievement tended to have been gathered only a short time after the integration of the schools.

Studies in which achievement measures were given to the same students before and after integration are valuable in that comparison of the same group of students ensures equality of the groups on such measures as individual socioeconomic status. The U.S. Commission on Civil Rights (1967), reviewing achievement before and after integration in the Berkeley School System, found that third, fourth, and sixth-grade black children in the integrated schools were progressing more rapidly than children in majority black schools.

Similarly, Maynor and Katzenmeyer (1974) found that performance of sixth through twelfth grade students on the California Achievement Test tended to be higher for black students following integration in North Carolina. Several investigators who have reviewed additional integration studies (Petti-

grew, Useem, Normand, and Smith, 1973; St. John, 1970) have concluded that, though not all studies have found significant differences, when differences are found, black performance has generally been higher following integration.

Methodological problems exist when these pre-post integration studies are considered. Significant results should be interpreted with caution because the school may be trying to upgrade education in general, and the observed effects may not be due to integration per se. In addition, short-term measures of achievement growth, measures taken after only six months or a year of integration may not be reliable indicators of long-term achievement changes. Also, integration in communities that are hostile to the change may have different effects than integration in communities that work actively for this goal. Few studies have attempted to measure the positive and negative community concomitants of integration.

In general, when both cross-sectional and before-after integration studies are considered, there is some evidence that minority performance may be higher in schools where the racial composition of the school is primarily white. A number of intervening factors could be related to this differential achievement including individual socioeconomic status, peer socioeconomic status, teacher expectations, differences in school resources, and attitude and belief factors.

There is strong evidence that socioeconomic status and achievement are closely related (Coleman, Campbell, Hobson, McPartland, Mood, Weinfeld, and York, 1966; U.S. Department of Health, Education and Welfare, 1971; Vane, 1966; Wilson, 1963). Moreover, not only may the individual's socioeconomic status be related to his achievement but the social class climate of the school may be related. In Coleman's national sample (Coleman, Campbell,

Hobson, McPartland, Mood, Weinfeld, and York, 1966) this variable was found to be the most significant of the school variables related to the students' achievement.

Other factors that may be related to a performance differential between minority children in schools that are primarily minority as compared to minority children in schools in which the racial composition is primarily white, may be teachers' expectations and the economic resources of the school. Rosenthal and Jacobson (1968) have demonstrated how the expectations of teachers can affect student achievement. The highly controversial issue of how and to what extent school resources affect student achievement is reviewed by Shea (1976). Both of these variables, teacher expectation and school resources, could potentially be related to the issue under consideration here.

Finally, various attitudinal factors could be related to the differences in achievement between blacks in schools with a minority and majority of white students. In the Coleman study (Coleman, Campbell, Hobson, McPartland, Mood, Weinfeld, and York, 1966) student attitudes (self-concept, interest in school, and sense of control of environment) showed a stronger relation to achievement than the family background and school variables. For blacks, the most important of these attitude variables was the sense of environmental control. Furthermore, this sense of control for blacks was found to increase as the proportion of whites in the school increased. This finding has since been replicated in sixth graders from thirty-six Boston schools (St. John, 1971). Similarly, Epps (1974) found that black students' perceptions of limited opportunities and self-concept of ability were related to student achievement.

In summary, if differences in achievement exist between students in racially impacted versus nonimpacted schools, these differences could be attributed to a variety of factors. The purpose of this study is, first and foremost, to determine if such differences exist in the Ann Arbor Public Schools, and if such differences are found, if they are still present after the child's socioeconomic status is taken into account. It is anticipated that the present efforts will continue to raise the question of what intervening variables result in any achievement differential. This study can only examine the variables specified. The likelihood that other factors such as curriculum content, teacher attitudes, student attitudes, etc. may account for significant amounts of any existing differences must be recognized.

METHODS, DESIGN, PROCEDURES

POPULATION

The population of this study was located in eleven of the Ann Arbor elementary schools. This size was manageable and contained the necessary characteristic differentiations. These eleven schools were divided into three levels according to the percentage of minority students in the school. Category one or Racial Impact Level (RIL) included schools with a minority student population of approximately fourteen percent. The second category was made up of schools with about a twenty-five percent minority student group. The third level was made up of those schools with the highest percentage of minority group students or near fifty percent.

Within the eleven identified schools, the decision was made to concentrate the study upon fifth-grade students. There were two specific

reasons for this decision. First, each fifth grade had been administered a standardized survey achievement instrument in the fall of 1976. Second, was the belief of the research team that by the time a student reaches the fifth grade, he/she has been in school for a sufficient number of years for the school to have had an effect upon achievement. Thus, the availability of normed data plus the philosophical belief in school impact directed the study toward the fifth grade.

INSTRUMENTATION

The California Achievement Test, normed and published by CTB/McGraw-Hill in 1970, was used to collect data regarding student achievement. The CAT-70 was administered to all fifth graders in Ann Arbor in the fall of the 1976 school year. Classroom teachers administered the tests to their students. Reported to be a good general survey achievement instrument, the CAT-70 appears upon review to have good content validity for the Ann Arbor curriculum.

Demographic data were gathered from all Ann Arbor fifth graders by asking parents to complete a new school registration form. Added to the standard school form were additional parent occupational and educational categories (see Appendix B). The decision to request these demographic data from parents was made after a review of student files revealed a serious lack of information. Since not all parents returned the requested data, the necessity of relying upon available files and the knowledge of building principals remained.

RESEARCH DESIGN

Dependent variables. The subtests of the California Achievement Test (Tiegs and Clark, 1970) were the dependent variables. A review of the data revealed a question of local reliability with two of the subtests. As a result, the decision was made to limit the dependent variables to six. These subtests were reading comprehension, math computation, math concepts, language mechanics, and language usage. From these, an overall academic achievement score was obtained. The data from the subtests of reading vocabulary and spelling were not usable. For the purpose of this study, students' raw scores were of primary interest. The CAT-70 was administered in all Ann Arbor schools in the fall of the 1976-77 academic year.

Independent variables. Two types of independent variables were included: school factors and individual factors. The school factor was the degree of racial impaction. The individual factors were race, sex, family organization (two parents/one parent), three measures of family socioeconomic status, and the number of years the student had attended the present school.

TABLE OF RESEARCH VARIABLES

Independent	Dependent
1. Race	1. Overall Academic Achievement
2. Sex	2. Reading Comprehension Achievement
3. Family Organization	3. Math Computation Achievement
4. Parent Educational Level	4. Math Concept Achievement
5. Parent Occupational Prestige	5. Language Mechanics Achievement
6. Estimated Family Income	6. Language Usage Achievement
7. Number of Years in Attendance	

Designated as covariates or independent variables whose effects would be controlled for in the study, were the number of years the student had attended the school and three indicators of family socioeconomic status. These indicators were: (1) the average educational level of the parents. These data were determined by summing and then averaging mother's and father's years of education. In the case of data for only one parent, these data were utilized. (2) The highest occupational prestige factor in the home was utilized if two parents were employed (Siegle, 1971). (3) The estimated total family income was the third factor. These data were taken from the Characteristics of the Population, 1970 Census, utilizing occupation information either supplied by the parents, obtained from student files, or from building principals' recollection.

DATA ANALYSIS

Linear regression methods were used to estimate the prediction equation for academic achievement as a function of six individual variables. These methods extract differences which are the result of socioeconomic status. Prior to analyzing the data, all student raw scores were converted to a standardized value. The value utilized for this study was the Z-score. The formula for this conversion is as follows:

$$Z = \frac{\text{Raw Score} - \text{Mean}}{\text{Standard Deviation}}$$

The reason for this conversion was the fact that the five subtest dependent variables had raw scores of varying size. Thus it was necessary to place all values on a standard scale before analysis could begin. The Z-score has a mean of zero and a standard deviation of one and was adaptable to the statistical procedures. Strictly for the purposes of presentation and to eliminate negative values, the data were transformed to more

readily understood T-scores, which are used in this report. T-scores have a mean of 50. The formula for the transformation of Z- to T-scores is as follows: $T = Z(10) + 50$. The regression equation, then, gave the overall predictive strength of the set of variables which were measures of individual characteristics plus the relative contributions of each of these variables and their interactions.

The estimated prediction equations were then used to calculate the mean achievement score, adjusted for the effects of the individual factors and for the three Racial Impact Levels. Parametric statistical tests of these adjusted means were inappropriate since they are population means. However, these adjusted means were plotted against the interval-scaled school variable, which was the Racial Impact Level (RIL). This revealed the relationship between the school factor and academic achievement after the effects due to the individual socioeconomic variables had been removed.

These analyses were done for each of the five subtest dependent variables plus the overall measure of academic achievement, which was obtained as a mean of the subtest Z-scores, and were performed separately for minority group students, majority group students, and all students combined. Further analyses were based upon the sex variable within these major groups and upon the years the student had attended the school.

FINDINGS

The following data are presented as the results of this research effort. At times, a table format is utilized while in most instances a graph display has been used. Every effort has been made to present the data in

as readable a form as possible, both for professiona's and lay persons. The reader is once more cautioned that student achievement values reported in this study are standardized T-scores, adjusted for individual SES characteristics. These T-score values were developed uniquely for each group and subgroup which is reported and thus are not comparable group to group. Any attempt to make such a comparison would constitute a gross misinterpretation of the data presented here.

A discussion precedes each table or graph. These statements are designed to assist the reader in his/her understanding of the statistical presentation.

Table 1 describes the eleven schools involved in the study according to the racial ethnic identity of their students as they are grouped into three Racial Impact Levels. These data were taken from the Student Racial/Ethnic Head Count of the Ann Arbor Public Schools, October 1, 1976. These data enabled the researchers to categorize the schools into three levels of racial identity.

TABLE 1

APPROXIMATE AVERAGE STUDENT RACIAL HEAD COUNT
FOR SCHOOLS* IN EACH LEVEL

LEVEL	SCHOOL N RANGE	RANGE % BLACK	RANGE % WHITE	RANGE % AMER. INDIAN	RANGE % ASIAN	RANGE % LATINO
I	225-550	11-15%	80-82%	0-2%	2-5%	1-3%
II	250-325	22-24%	74-75%	0-2%	1-3%	0-1%
III	275-500	47-51%	46-48%	0-1%	1-4%	1-2%

*Bach, Bryant, Dicken, King, Mack, Mitchell, Northside, Pattengill, Pittsfield, Stone, and Wines

Four hundred fifty students were involved in the study. The breakdown of these numbers by racial impact level, race, sex and other individual characteristics is presented in Table 2.

The data in the following tables are presented in standard scores (SS). Along with these data are given the number (N) of students in each category as well as the standard deviation (SD). Again, the reminder is made that it is not possible to make comparisons between any groups since the standardization process took place only within groups.

The data in Table 3 present the overall academic achievement levels for all students by racial impaction level. While a slight trend may be noted in these data with students in schools having a lower impaction level scoring slightly higher, the differences are very small and are not of consequence.

TABLE 3

MEAN OVERALL ACADEMIC ACHIEVEMENT - ALL STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS

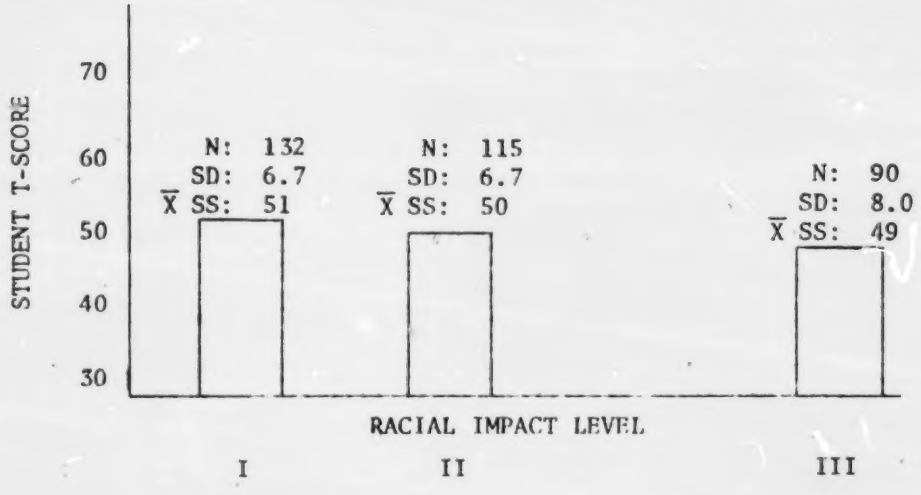


TABLE 2

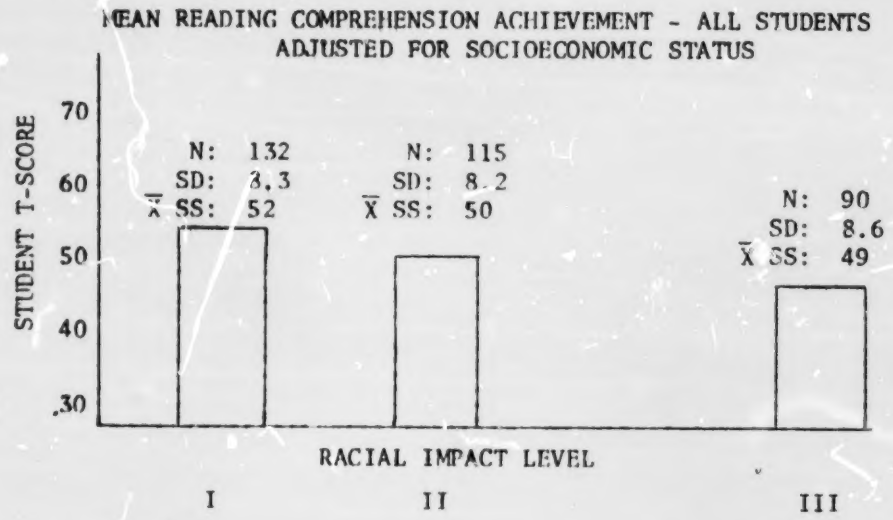
PERCENT OF STUDENTS IN STUDY BY RACIAL IMPACT LEVEL AND INDIVIDUAL CHARACTERISTICS

	N	% Black	% White	% Male	% Female	N	FAMILY ORGANIZATION % 1-Parent	% 2-Parent
Level I	185	12.4	83.2	53.8	46.2	165	20.0	80.0
Level II	142	24.6	72.5	57.0	43.0	133	19.5	80.5
Level III	120	54.1	43.3	54.2	45.8	109	32.1	67.9

	PARENTAL EDUCATION IN YEARS					NUMBER YEARS STUDENT AT SCHOOL			
	N	<12	(H.S.+) 12-16	(B.A.+) 16-18	M.A. (Ph.D.-M.D.) 18-20	N	<2	2-3	4-5
Level I	159	5.0	42.1	30.2	22.6	132	15.9	26.5	57.6
Level II	132	7.6	52.3	17.4	22.7	115	18.3	13.9	67.8
Level III	108	24.1	52.8	12.9	10.2	90	17.8	23.3	58.9

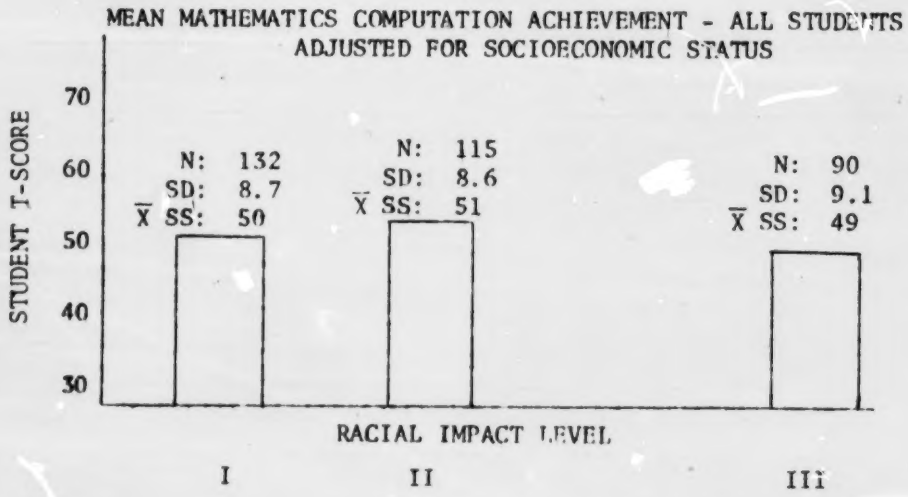
Table 4 examines all student achievement in the area of reading comprehension. Again, no strong trends are apparent.

TABLE 4



Again in Table 5, no trends are discernible. When SES is controlled for all students, no differences appear.

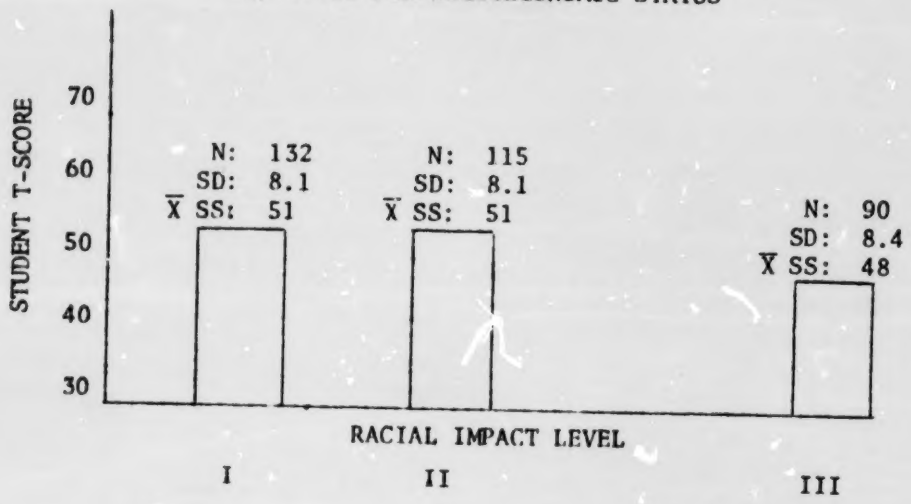
TABLE 5



A very slight trend seems to emerge between levels II and III according to the data in Table 6. The difference is small but worth noting.

TABLE 6

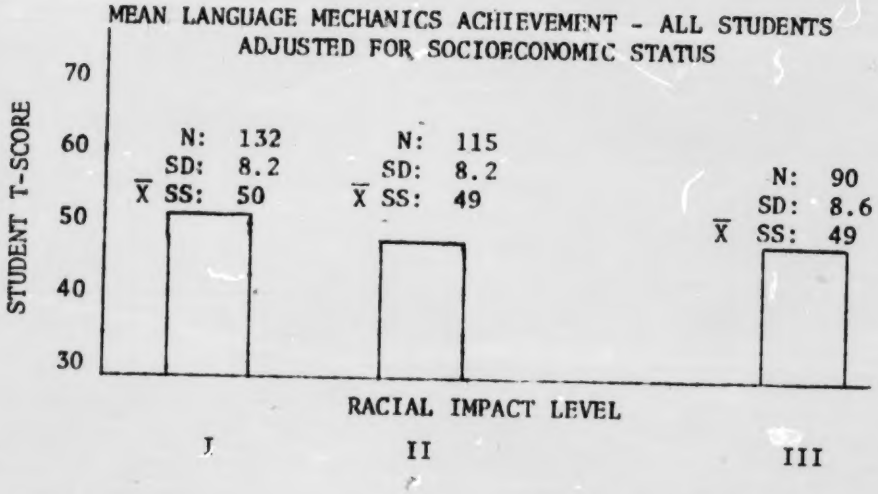
MEAN MATHEMATICS CONCEPT ACHIEVEMENT - ALL STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS



No trend appears in the data for language mechanics when all students are considered.

TABLE 7

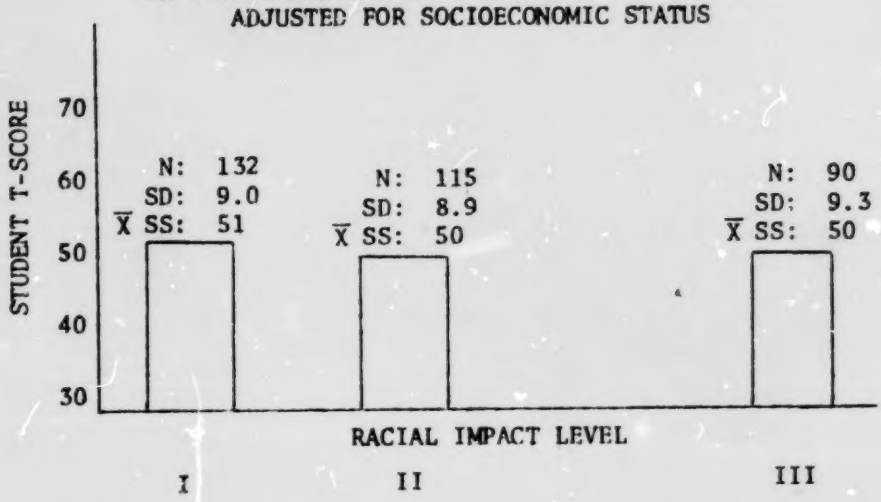
MEAN LANGUAGE MECHANICS ACHIEVEMENT - ALL STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS



The language usage data reveals no directional trend according to Table 8.

TABLE 8

MEAN LANGUAGE USAGE ACHIEVEMENT - ALL STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS



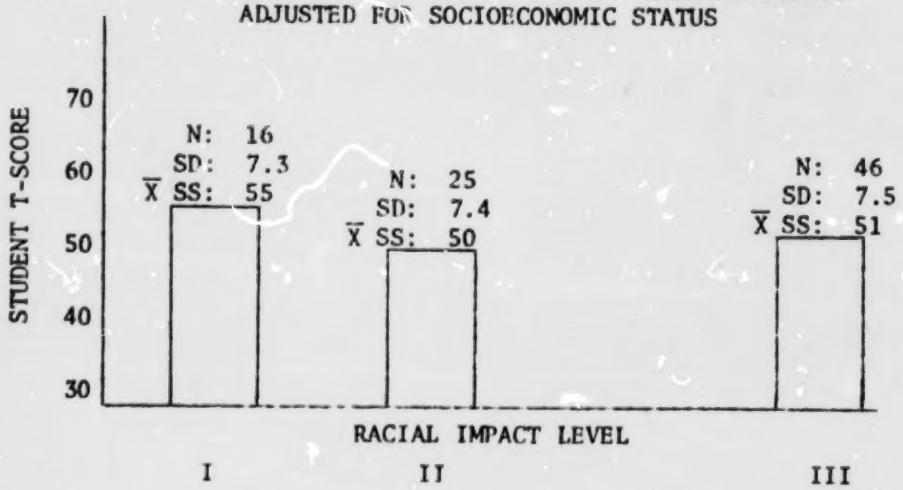
All of the tables which follow report only the appearance of trend data. While data are available for all subgroups by Racial Impact Level and by each of the dependent variables (overall achievement and each subtest), the author has not included additional nontrend data in the body of this report. The reason for this was to assist the reader in arriving at conclusions regarding the data. All data, however, are available in the appendix at the conclusion of the report.

As the data are examined by racial subgroup, trends begin to emerge. In viewing the scores for black students, a solid trend appears as scores increase with the declining numbers of minority group students in the schools. It would seem that if percentage of minority group students

were the only criteria to be considered a transition point exists somewhere between RIL I (which represents the average) and II (which represents schools of approximately 25% minority population) at which achievement improves. An examination of data in the following tables will reveal evidence that the question is far more complicated and confounding. Still, as the data in Table 9 are examined, a solid trend is noted.

TABLE 9

MEAN OVERALL ACADEMIC ACHIEVEMENT - BLACK STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS



On the specific subtest of reading comprehension, the trend noted for overall achievement continues for black students. Once more a break point appears to exist between minority group representation levels of 15-25%.

TABLE 10

MEAN READING COMPREHENSION ACHIEVEMENT - BLACK STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS

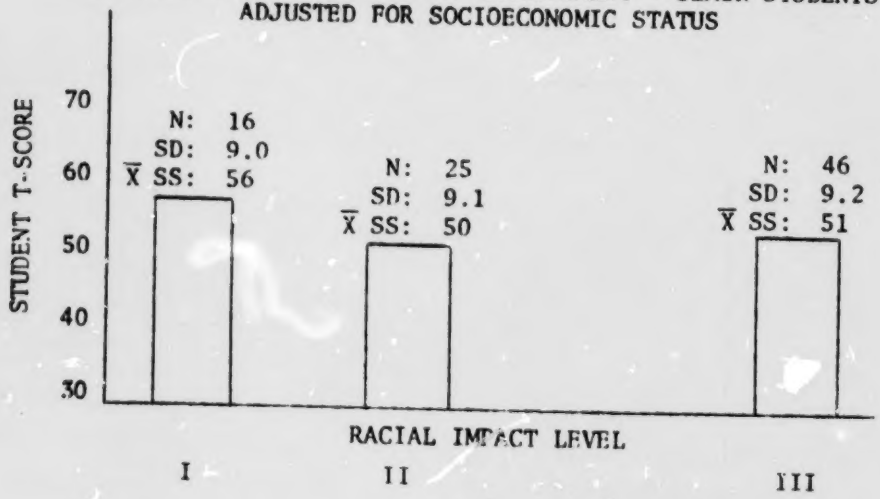
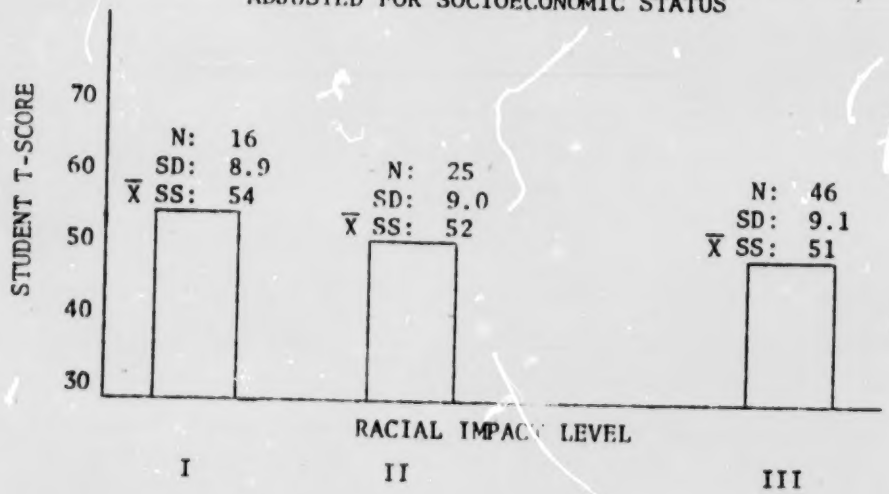


Table 11 continues to describe the trend noted on previous pages which deal with black student achievement. While still present for math computation, the trend does appear to lose some strength in that the differences between RIL are not as great.

TABLE 11

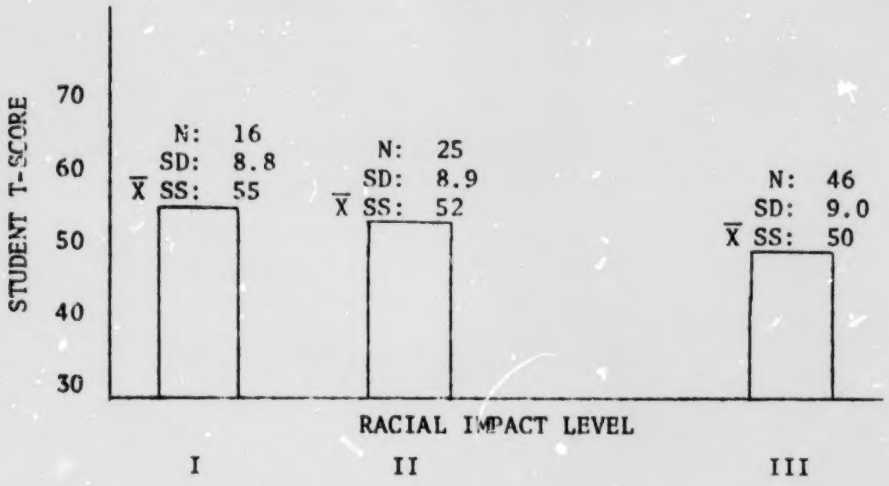
MEAN MATHEMATICS COMPUTATION ACHIEVEMENT - BLACK STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS



Math concept achievement seems to follow the same pattern noted in the previous table. Once more, the trend is for black student achievement to gain in an inverse proportion to the percent of black students in the school.

TABLE 12

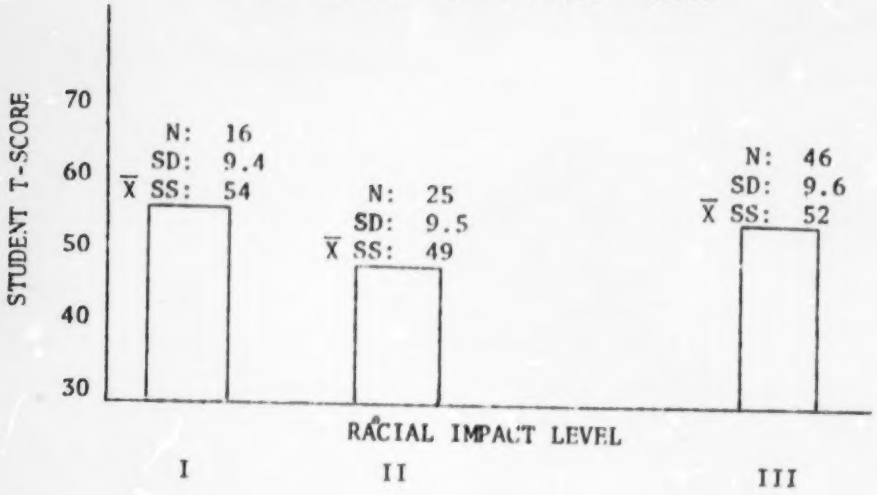
MEAN MATHEMATICS CONCEPT ACHIEVEMENT - BLACK STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS



A different trend begins to emerge as illustrated by the data in Table 13. Previously, the direction of gain in achievement was quite steady from the highly impacted schools to those in Level I. As can be noted in this table, the trend is distinguished by a decline in achievement levels between the varying levels of minority group representation. This would seem to suggest that another factor was affecting the scores. Perhaps a curriculum or attitudinal variable in RIL II is influencing student basic skill achievement.

TABLE 13

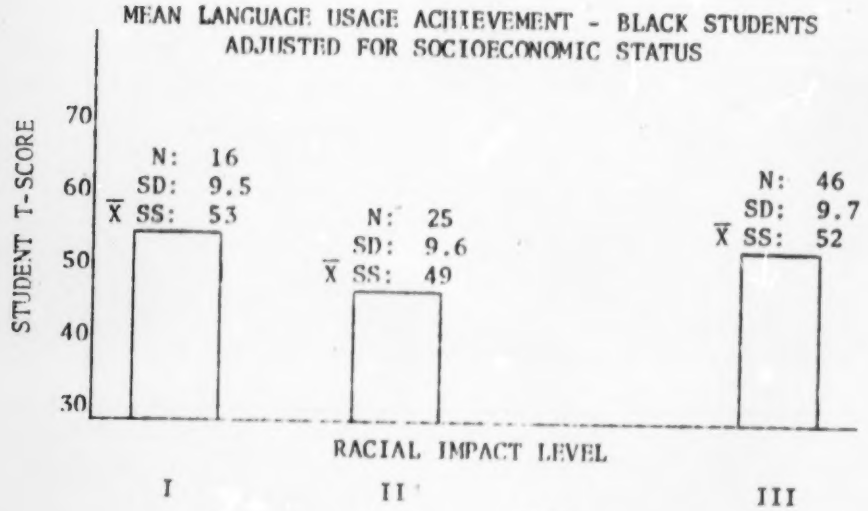
MEAN LANGUAGE MECHANICS ACHIEVEMENT - BLACK STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS



Similar to the previous table, the data presented in Table 14 suggest a trend with peaks at the extremes of the racial impaction scale. Again, the suggestion must be observed that factors other than the percentage of minority group representation are influencing achievement.

TABLE 14

MEAN LANGUAGE USAGE ACHIEVEMENT - BLACK STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS



All data for white students were very consistent. No observable trends were noted between racial impaction levels on either the measure of overall academic achievement or any of the subtests. It must be concluded that the degree of racial impaction of a school does not have an effect upon white student achievement as a group. Data regarding these interactions may be found in the appendix. Qualifiers to this statement may be noted in subsequent tables as the data are displayed according to sex differences.

Table 15 illustrates the reading comprehension achievement data for all males regardless of race. As may be noted, a trend appears between RII II and III. These data draw attention to the interaction of the sex variable.

TABLE 15

MEAN READING COMPREHENSION ACHIEVEMENT - ALL MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

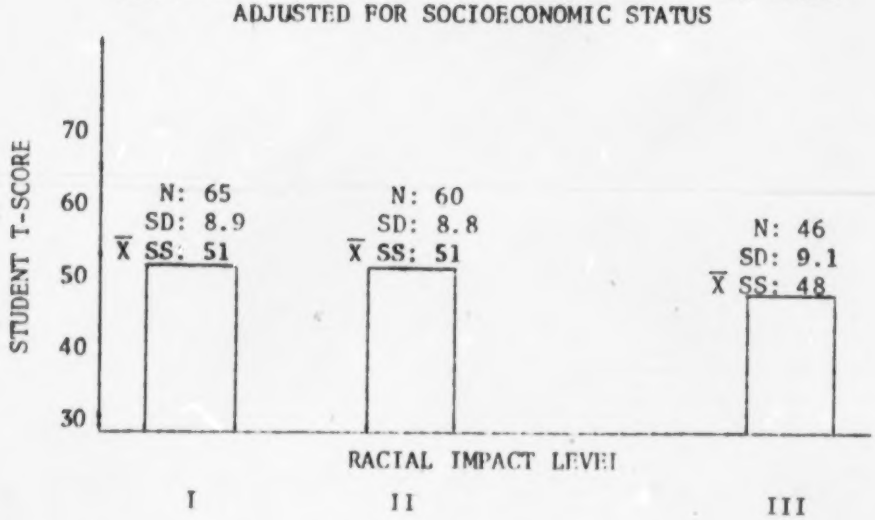


Table 16 continues to examine the data for all males as a group. A stronger trend is present between Racial Impact Level II and III in the area of math computation. Again, one must question whether or not factors other than race are having an impact upon achievement. The suggestion of curricula or attitudinal variables must be considered as a possibility.

TABLE 16

MEAN MATHEMATICS COMPUTATION ACHIEVEMENT - ALL MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

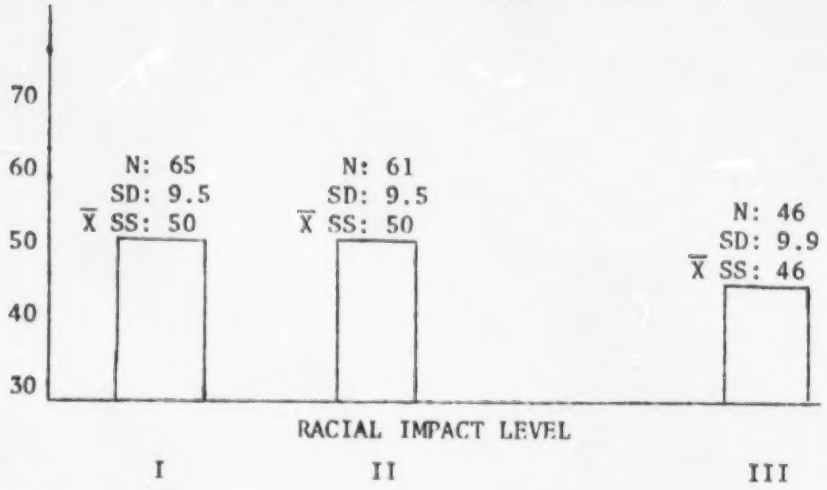
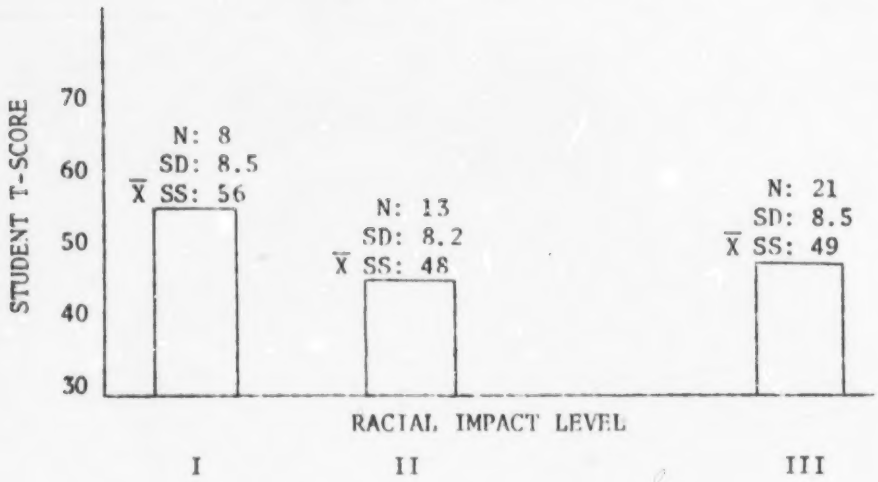


Table 17 replicates the data in the previous two tables. Male achievement appears to be optimized in the lower RIL.

TABLE 17

MEAN OVERALL ACADEMIC ACHIEVEMENT - BLACK MALES
ADJUSTED SOCIOECONOMIC STATUS



In the area of reading comprehension, the trend noted for overall achievement continues to be present and is in fact even stronger. There can be no denying the evidence that black males do not achieve in this area at same rates regardless of the percentage of minority group students in their school. Black males attending schools of average Ann Arbor Racial Impact Level achieve at considerably higher levels than do their counterparts in the more racially impacted schools. The interaction of the race, sex, and RIL variables produces an indication of a strong trend.

TABLE 18

MEAN READING COMPREHENSION ACHIEVEMENT - BLACK MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

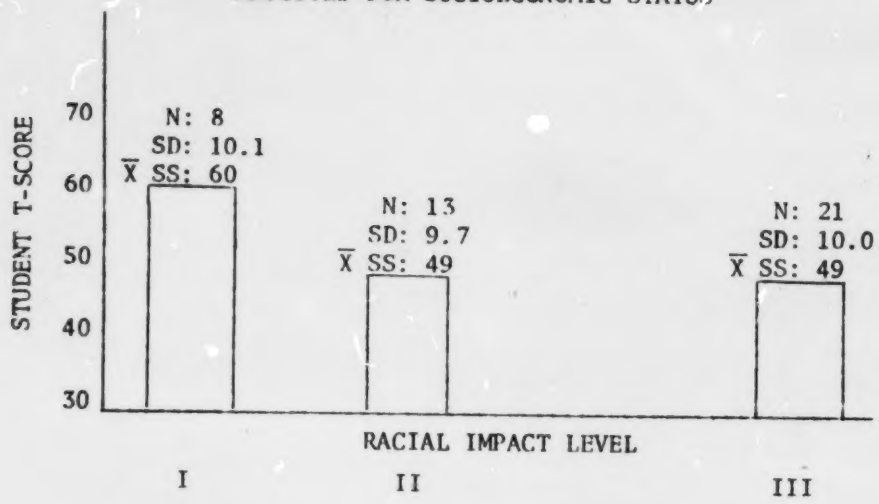


Table 19 continues to illustrate the trends previously observed for black males. The trend is present and quite strong.

TABLE 19

MEAN MATHEMATICS COMPUTATION ACHIEVEMENT - BLACK MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

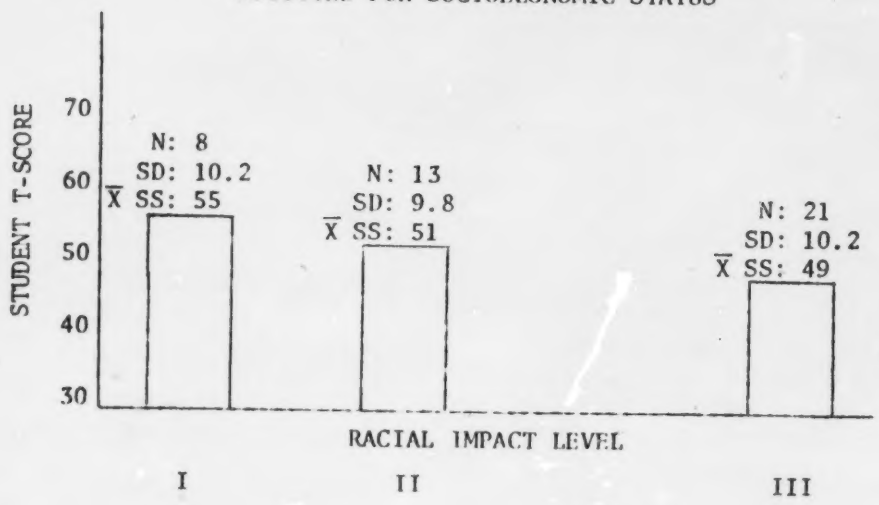
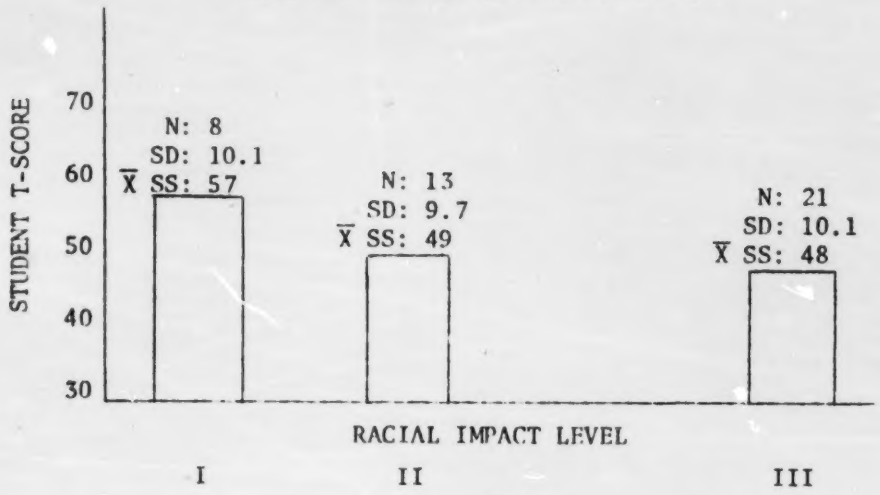


Table 20 supports the observation of the previous evidence regarding black males. The trend is present and quite strong directionally.

TABLE 20

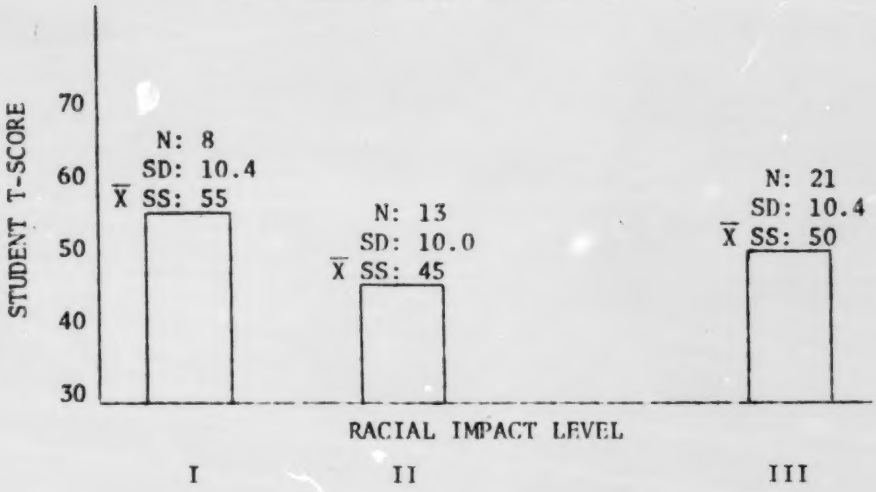
MEAN MATHEMATICS CONCEPT ACHIEVEMENT - BLACK MALES
ADJUSTED FOR SOCIOECONOMIC STATUS



The data contained in Table 21 continue to define the trends observed regarding black male achievement. However, the reader will note that suddenly instead of being directional the trend declines in the middle Racial Impact Level before again proceeding upward in the previous inverse proportion. These data once more raise the question of what other factors could be influencing achievement outcomes. This writer once more suggests that variables such as school climate, faculty attitude, student attitude, and curriculum content should be examined. It is also the opinion of this researcher that these data solidly refute any claims of varying levels of learning potential among students in the schools of varying Racial Impact Level.

TABLE 21

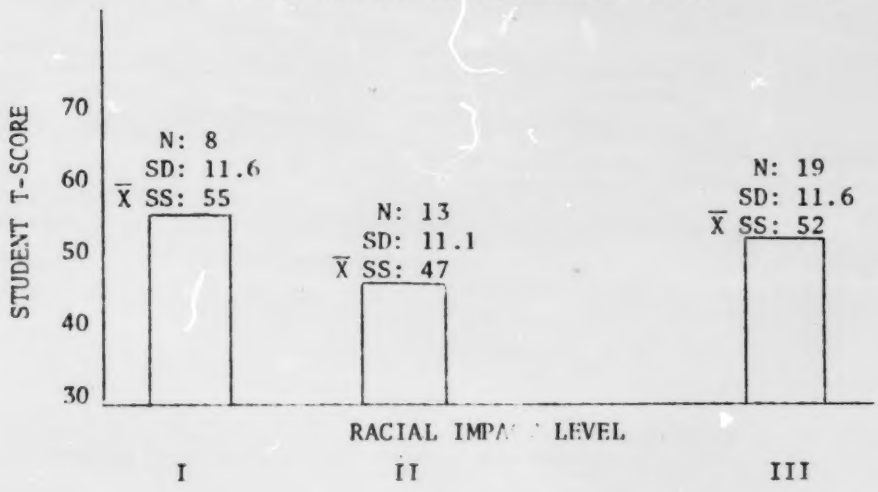
MEAN LANGUAGE MECHANICS ACHIEVEMENT - BLACK MALES
ADJUSTED FOR SOCIOECONOMIC STATUS



The observation noted for the data from the previous table continues to be true. The trend remains present though not on a direct linear scale for black male achievement in the area of language usage.

TABLE 22

MEAN LANGUAGE USAGE ACHIEVEMENT - BLACK MALES
ADJUSTED FOR SOCIOECONOMIC STATUS



Achievement data for white males were quite consistent between Racial Impact Level. As noted in Table 23, however, they indicate that white males do seem to achieve at lower rates in the area of math computation when attending schools of high Racial Impact Level. The data would seem to indicate once more the power of the sex variable as it interacts with achievement and RIL.

TABLE 23

MEAN MATHEMATICS COMPUTATION ACHIEVEMENT - WHITE MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

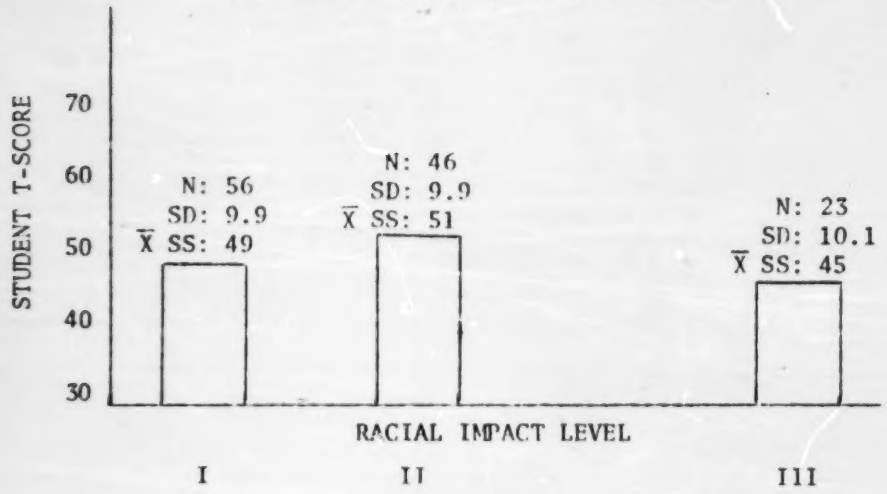
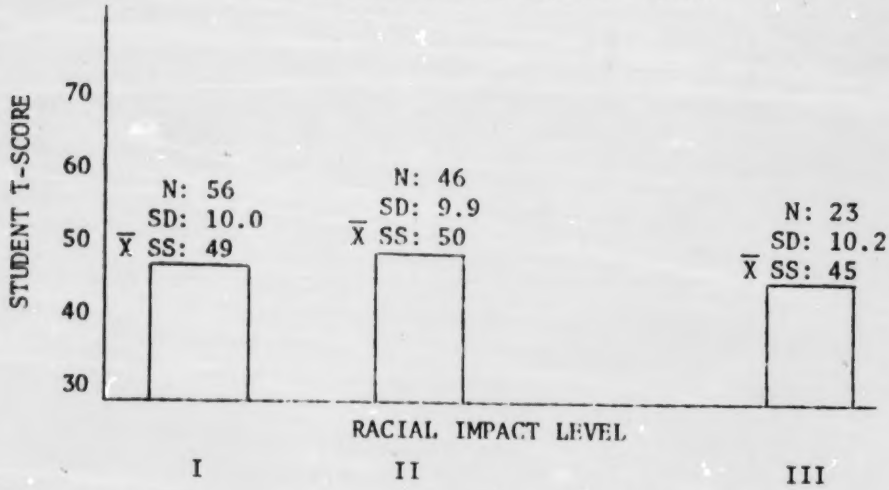


Table 24 repeats the findings demonstrated in the previous table. The pattern of the trend is consistent with the data reported for math computation. This writer can offer no definitive hypothesis as to why these two specific skill areas, and only these two, seem to be affected in this pattern for white males attending varying Racial Impact Level schools.

TABLE 24

MEAN LANGUAGE USAGE ACHIEVEMENT - WHITE MALES
ADJUSTED FOR SOCIOECONOMIC STATUS



Only a weak shift may be observed for females in overall achievement. Of interest, however, is the fact that once again the point of division seems to be between Racial Impact Level I and II.

TABLE 25

MEAN OVERALL ACADEMIC ACHIEVEMENT - ALL FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

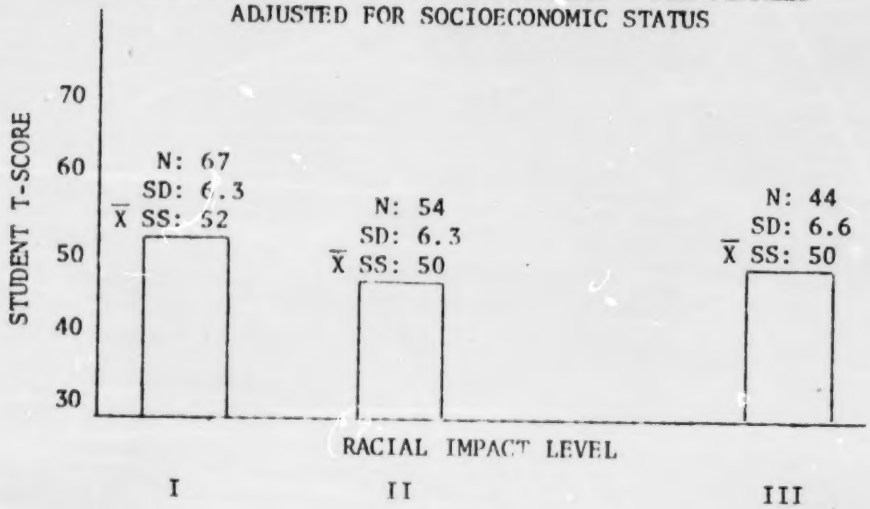
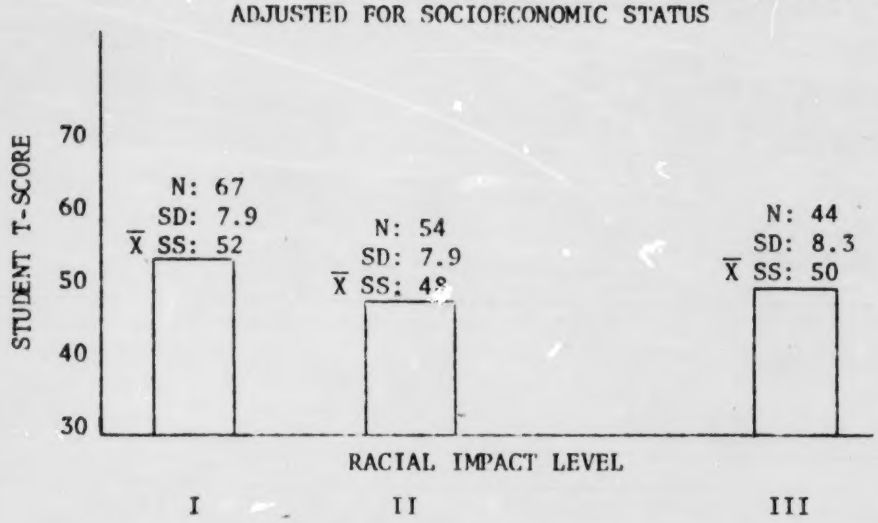


Table 26, while replicating the pattern observed in previous tables, is puzzling. Only two skill areas were so identified for females. A curriculum concern would again seem to be a reasonable hypothesis for the nature of these data.

TABLE 26

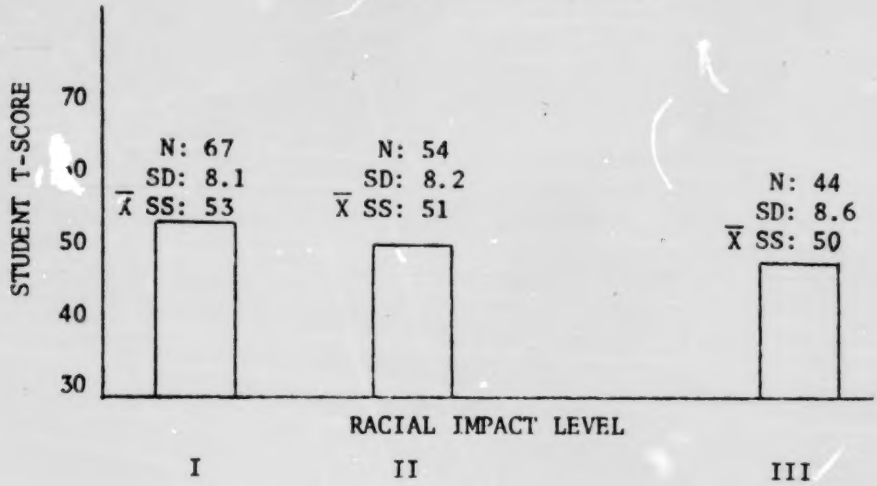
MEAN READING COMPREHENSION ACHIEVEMENT - ALL FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS



Again, in Table 27, only the weakest of trend data is observable for all females. While the pattern is consistent with the evidence presented in Table 26, the author is at a loss to offer thoughts as to any additional reasons why the area of language mechanics is targeted.

TABLE 27

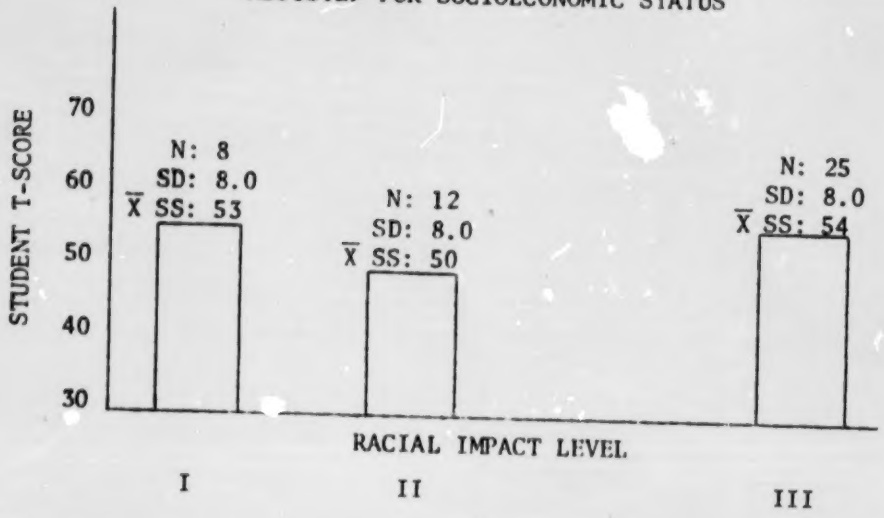
MEAN LANGUAGE MECHANICS ACHIEVEMENT - ALL FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS



The previously noted trend which seems to produce a graphic dip in the middle Racial Impact Level is demonstrated once more in these reading comprehension data for black females. Precise explanations for these data are impossible without additional investigation. As mentioned in earlier discussions, the areas of curricula and aspects of generalized attitudes within the total school environment are possible explanations for the differences.

TABLE 28

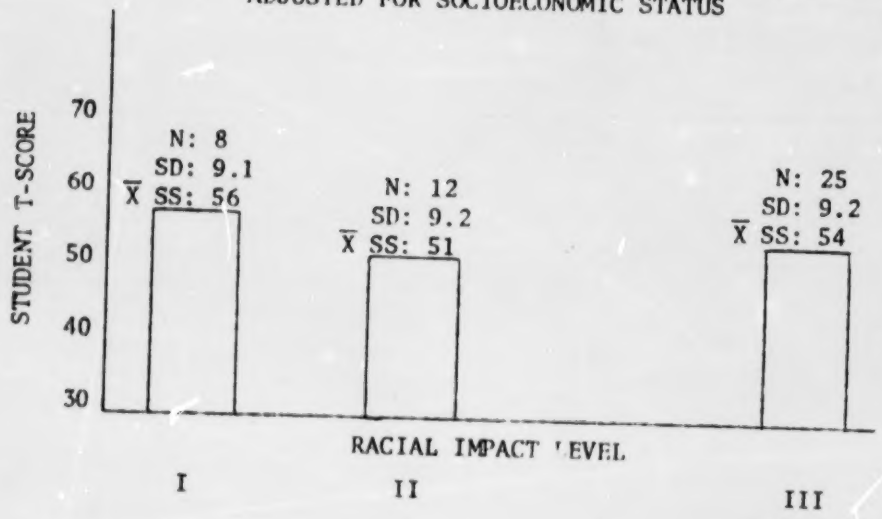
MEAN READING COMPREHENSION ACHIEVEMENT - BLACK FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS



Data very similar to those reported in the previous table are once more present in Table 29. The author's observations regarding these data remain essentially the same.

TABLE 29

MEAN LANGUAGE MECHANICS ACHIEVEMENT - BLACK FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS



The data presented for black females regarding language usage achievement follow the trend pattern presented in the two previous tables.

TABLE 30

MEAN LANGUAGE USAGE ACHIEVEMENT - BLACK FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

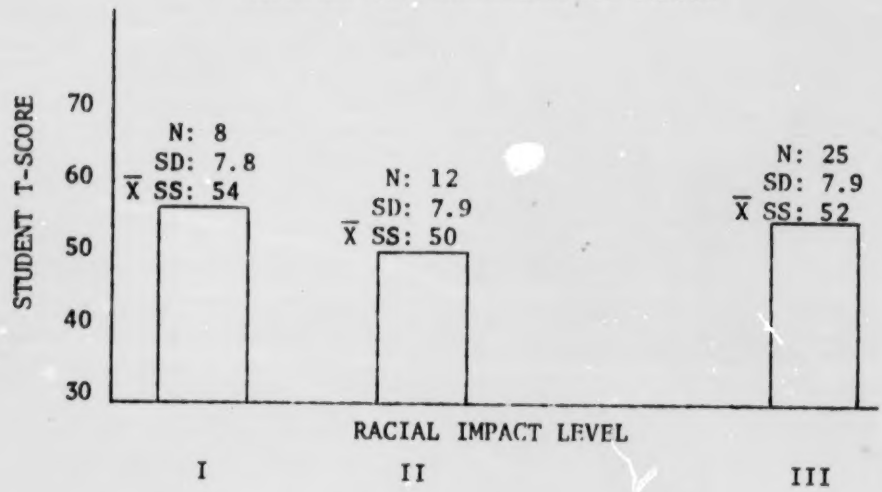


Table 31 presents data in the area of reading comprehension for white females. These data follow the directional trends for black females present in Table 28. Again, the climate and attitudinal hypotheses of the author remain intact for data of this nature.

TABLE 31

MEAN READING COMPREHENSION ACHIEVEMENT - WHITE FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

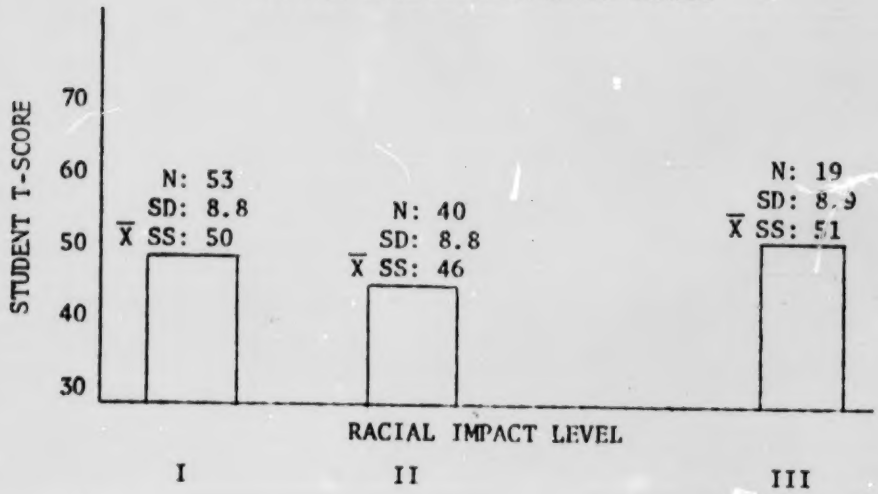
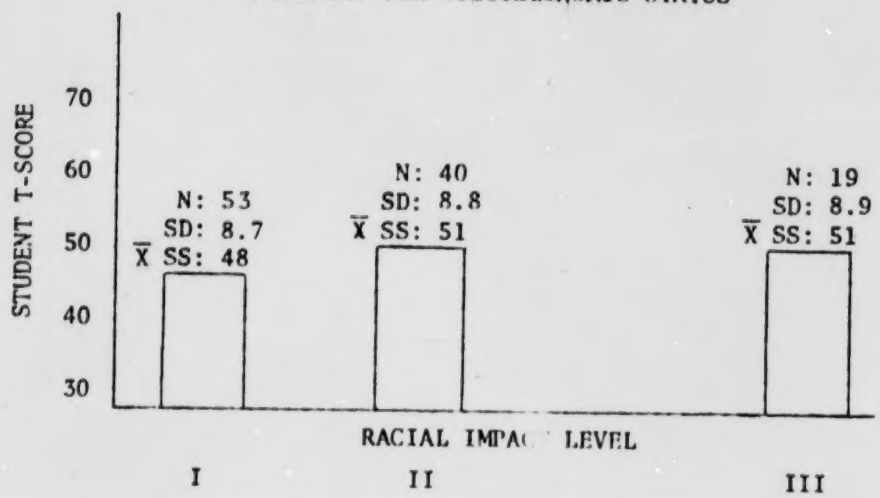


Table 32 presents the only occasion when the data trend is reversed. White females appear to achieve at a higher level in math computation in RIL II and III.

TABLE 32

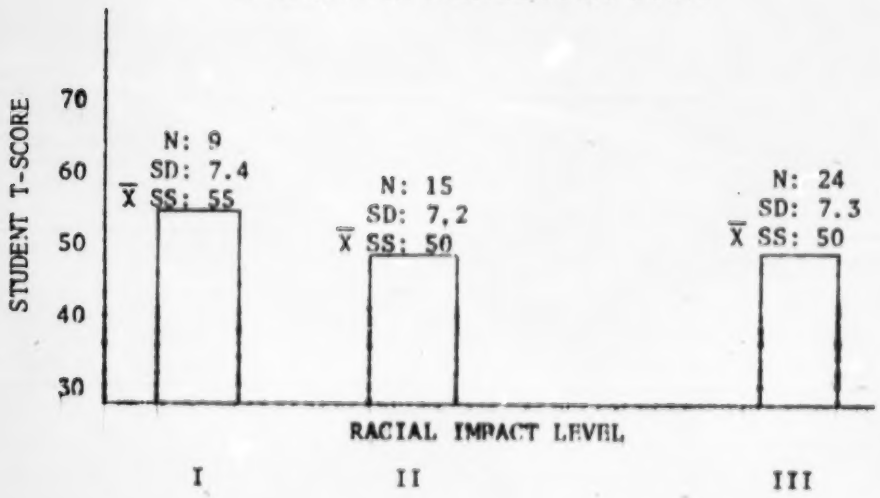
MEAN MATH COMPUTATION ACHIEVEMENT - WHITE FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS



The number of years students have attended their school was one of the individual characteristic variables upon which the data were examined. This tenure variable was divided into three categories. The categories were: (1) less than two years; (2) two-three years; and (3) four-five years. Four trends were discernible in the data, two for black students and two for white. These data were first observed in the area of overall academic achievement for black students in the four-five year category. The trend pattern presented in Table 33 is consistent with some of the earlier observations. Between Racial Impact Level I and II, student achievement gains markedly.

TABLE 33

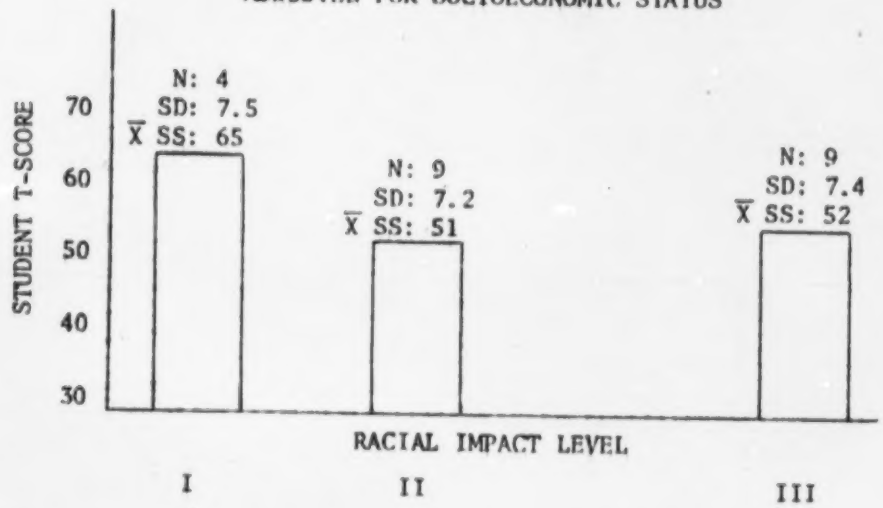
MEAN OVERALL ACADEMIC ACHIEVEMENT - BLACK STUDENTS
IN SCHOOL FOUR-FIVE YEARS
ADJUSTED FOR SOCIOECONOMIC STATUS



The data in Table 34 define a rather dramatic trend in the data between Racial Impact Level. However, few conclusions can be drawn regarding the data. First, the number of students for whom data were available in Racial Impact Level I is very small. Second, these students have all been in their schools less than two years, making it extremely difficult, if not impossible, to draw conclusions regarding the school effects which produced these results.

TABLE 34

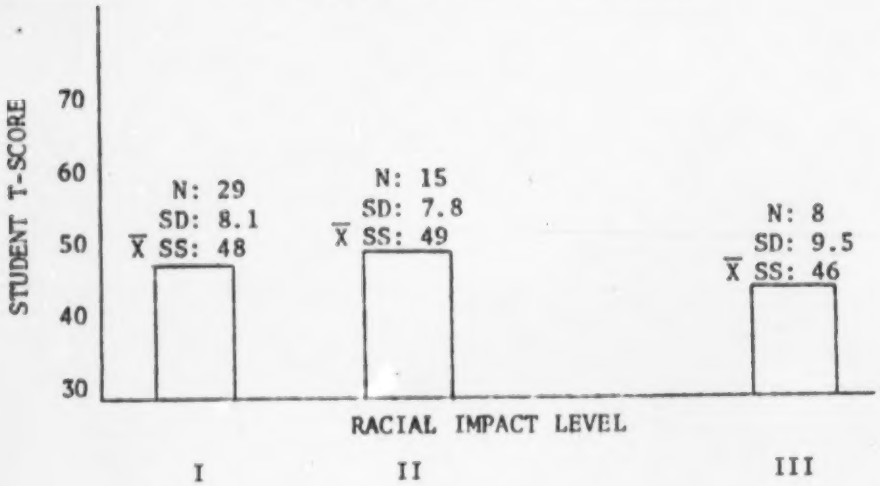
MEAN OVERALL ACADEMIC ACHIEVEMENT - BLACK STUDENTS
IN SCHOOL LESS THAN TWO YEARS
ADJUSTED FOR SOCIOECONOMIC STATUS



The weak trend observed for white students occurred in the time range of two to three years. The pattern is consistent with earlier observations which indicated that achievement improves as the percentage of minority group students declines. The data cannot be considered decisive, however, since the trend is not found in the four to five year range.

TABLE 35

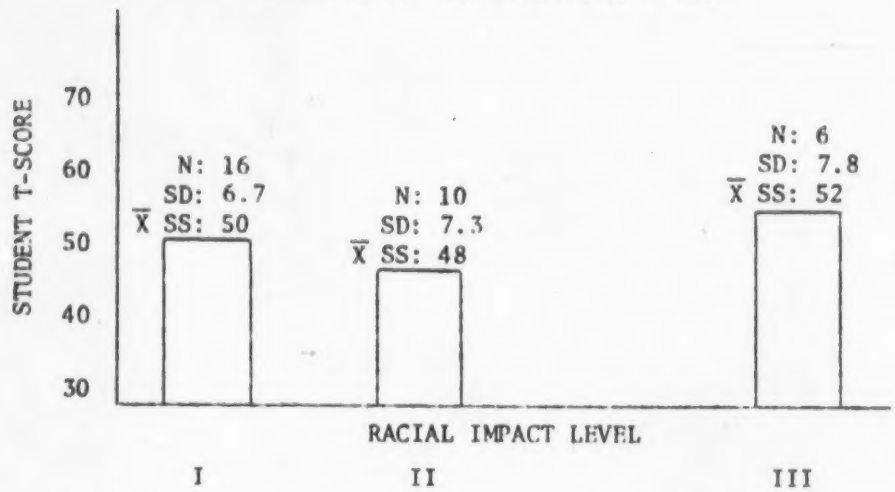
MEAN OVERALL ACADEMIC ACHIEVEMENT - WHITE STUDENTS
IN SCHOOL TWO-THREE YEARS
ADJUSTED FOR SOCIOECONOMIC STATUS



A previously noted trend pattern appears in the data presented in Table 36. The question of why the pattern is so often repeated with so many different variables must be raised. While these particular trend directions should not be considered as conclusive, the pattern must draw attention. The author once more suggests additional investigation in the areas of school climate and curriculum content.

TABLE 36

MEAN OVERALL ACADEMIC ACHIEVEMENT - WHITE STUDENTS
IN SCHOOL LESS THAN TWO YEARS
ADJUSTED FOR SOCIOECONOMIC STATUS



SUMMARY

This investigation was designed to examine fifth grade student achievement while controlling statistically for the student's socioeconomic status. This research procedure which is a linear regression technique removed the effects of variables which were being controlled. Once these SES effects were removed the trend lines which remained were either the result of the school characteristic (Racial Impact Level), or some other undefined variable which could be either school or individual related. Lacking additional investigation, it is only possible to hypothesize regarding the nature of other effects and the degree of their impact.

An initial reading of the data produced by this effort could lead to the conclusion that observable trend lines are rather simplistic and easily explainable. Since the analysis was not designed to make comparisons between groups but to enable the study of trends within groups, it was necessary to study the results exhaustively. The initial impression was that black student achievement appeared to be negatively correlated with the variable identified in this report as Racial Impact Level. That is, it appeared that as the black student population increased in a school, black student achievement in all categories declined. These initial impressions while superficially true, were confounded by several additional pieces of information. As the pieces of the puzzle began to fit together, a far more intricate picture began to emerge.

Studying the data revealed a fairly general picture which indicated that the trend lines were not on a perfectly direct increasing scale with the RIL. That is, the correlation between black student achievement and RIL

was not one hundred percent. Rather, student achievement appears to be somewhat consistent for black students between RIL II and III, but achievement gains appear between levels I and II. This would suggest that something occurs in the total education environment as the minority group population of a school reduces from twenty-five toward fifteen percent. The precise point at which this modification occurs and/or ends is not clear. While such a correlation definitely exists, the reader must keep in mind that correlation does not imply cause and effect. An example of this concept is the high correlation of ice cream consumption and drownings in the month of July. The causal variable behind this high correlation is found with the monthly mean temperature.

The sex variable added another important piece of information. However, it too added to the complexity of the understandings being developed. An examination of the data on both the racial and sex variable indicated that the major share of the trend lines observed in the analysis of all black student achievement was accounted for by black males. The picture became clear that the racial variable could not be examined in isolation. The sex variable was at least as important as race and in some cases appears to be the dominant issue. Again, the puzzle became intricate. In the area of language mechanics and language usage, the previously observed patterns between RIL were no longer present. For the first time, a trend line which produced higher scores on either end of the RIL scale with a dip at level II was observed. These findings suggested that the RIL factor had less impact than had been previously believed and that the missing piece or pieces of the puzzle lay elsewhere. Obviously the interaction of race and sex variables impacted the data in a powerful manner.

At this point, only speculation is possible regarding the nature of these missing parts, though other research efforts indicate that it is highly likely that they are in fact school-related and are centered in either curriculum or attitudes. The data for black females would seem to confirm this hypothesis as the same type of pattern was noted on the subtests of reading comprehension, language mechanics, and language usage.

While the examination of the data for all white students did not reveal any trends associated with RIL, the sex variable produced observable lines. In a slightly different pattern, achievement scores for white males were correlated with RIL in the areas of math computation and language usage. However, instead of the point of differentiation occurring between RIL I and II, it appeared between level II and III. White female achievement data produced only one clear trend. These data were located in the area of reading comprehension and replicated the pattern for both black males and females in that a decline in scores appeared to be associated with the intermediate RIL.

Utilizing the sex variable data in isolation produced only weak trends for females. These findings were observed in the scores for overall academic achievement and subtests reading comprehension and language mechanics. The trends, while present, were relatively weak and occurred primarily between RIL I and II in the pattern reported for other subgroups. The findings for all males produced different results with the trends being observed in the areas of academic achievement and math computation. While the all-male trends were somewhat stronger, especially in math computation, the pattern varied and followed the only seldom observed differentiation between RIL II and III. This pattern, while not frequently observed, would seem to add

credence to the previously stated hypothesis that other factors contributed at least as heavily to achievement scores as the RIL.

One of the initial philosophical positions which led this study to be centered in the fifth grade was the belief that the longer the student was part of the school environment, the more impact it would have upon him/her. The data produced as a result of this phase of the investigation split on the race variable. For white students the intermediate range of years produced once more the trend pattern which divides between RIL II and III. For black students two levels of years produced trends but in a different pattern than for whites. A sharp trend was noted for black students who had attended their school less than two years. The break-point was between RIL I and II in what had become the most common pattern of this study. However, it should be noted that the number of students involved in this aspect of the investigation was small. This fact detracts considerably from the credibility of the results. Black student data for those who had attended four to five years produced another consistent trend. A correlation exists between the number of years black students have attended a school and their achievement levels. The data indicate that students in RIL I score higher than their peers in level II.

We know more about student achievement patterns for having completed this study. Some of the data seem clear. Black males achieve at lower levels in high RIL schools. But the question of why black males and not black females to the same degree remains a puzzle. The question of why black males and not white males to the same degree remains a puzzle. The question of which impact level produces optimum achievement levels for all students is not clear. Most of the data in this study suggest that a

fifteen percent RIL of minority group representation is the optimal level at which minority group achievement is optimized. Added to these puzzling effects are those data which indicate similar achievement levels between high and average Ann Arbor impact levels, with lower scores for students in the intermediate range.

Given these varied results, differing trends, and frequent indicators of no difference between race, sex, years in school, or racial impaction levels, generalizations are difficult. Still, the author comes away from these findings with the impression that the percentage of minority group students in a school does make a difference in student achievement. However, equally strong is the impression that it is not a simple question of race, or sex, or years in school. Rather, the author is of the opinion that it is all of these plus factors such as teacher attitude, school curriculum, student attitude, parent attitude, school climate and others which are the real determiners of student achievement. It is believed that these complex human interactions affect student achievement at least as strongly as the variables included in this study.

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APPENDIX A

The following tables include data for which no trends were identifiable. In the interest of economy of space they are presented in statistical rather than graph format.

TABLE 37

MEAN OVERALL ACADEMIC ACHIEVEMENT - WHITE STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	109	86	42
SD	7.0	7.0	7.1
$\overline{X}SS$	49	50	51

TABLE 38

MEAN READING COMPREHENSION ACHIEVEMENT - WHITE STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	109	85	42
SD	8.9	8.9	9.0
$\overline{X}SS$	50	51	51

TABLE 39

MEAN MATH COMPUTATION ACHIEVEMENT - WHITE STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	109	85	42
SD	9.3	9.2	9.5
$\bar{X}SS$	48	50	48

TABLE 40

MEAN MATH CONCEPT ACHIEVEMENT - WHITE STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	109	85	42
SD	8.7	8.7	8.9
$\bar{X}SS$	49	51	50

TABLE 41

MEAN LANGUAGE MECHANICS ACHIEVEMENT - WHITE STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	109	85	42
SD	8.6	8.5	8.7
$\bar{X}SS$	49	49	49

TABLE 42

MEAN LANGUAGE USAGE ACHIEVEMENT - WHITE STUDENTS
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	109	82	42
SD	9.6	9.5	9.7
$\bar{X}SS$	50	50	48

TABLE 43

MEAN OVERALL ACADEMIC ACHIEVEMENT - ALL MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	65	61	46
SD	7.4	7.4	7.6
$\bar{X}SS$	50	50	48

TABLE 44

MEAN LANGUAGE MECHANICS ACHIEVEMENT - ALL MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	65	61	46
SD	8.6	8.6	8.9
$\bar{X}SS$	49	47	48

TABLE 45

MEAN LANGUAGE USAGE ACHIEVEMENT - ALL MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	65	59	44
SD	9.7	9.8	10.0
$\overline{X}$SS	50	49	48

TABLE 46

MEAN OVERALL ACADEMIC ACHIEVEMENT - WHITE MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	56	46	23
SD	7.2	7.2	7.4
$\overline{X}$SS	48	50	48

TABLE 47

MEAN READING COMPREHENSION ACHIEVEMENT - WHITE MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	56	46	23
SD	9.1	9.1	9.3
$\overline{X}$SS	49	51	51

TABLE 48

MEAN MATH CONCEPT ACHIEVEMENT - WHITE MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	56	45	23
SD	9.1	9.0	9.2
$\overline{X}SS$	49	51	50

TABLE 49

MEAN LANGUAGE MECHANICS ACHIEVEMENT - WHITE MALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	56	46	23
SD	8.7	8.6	8.8
$\overline{X}SS$	47	47	47

TABLE 50

MEAN MATH COMPUTATION ACHIEVEMENT - ALL FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	67	54	44
SD	7.9	7.8	8.2
$\overline{X}SS$	50	51	51

TABLE 51

MEAN MATH CONCEPT ACHIEVEMENT - ALL FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	67	54	44
SD	7.4	7.4	7.7
$\bar{X}SS$	51	51	49

TABLE 52

MEAN LANGUAGE USAGE ACHIEVEMENT - ALL FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	67	52	44
SD	8.2	8.4	8.7
$\bar{X}SS$	52	50	51

TABLE 53

MEAN OVERALL ACADEMIC ACHIEVEMENT - BLACK FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	8	12	25
SD	6.3	6.4	6.4
$\bar{X}SS$	54	53	53

TABLE 54

MEAN MATH COMPUTATION ACHIEVEMENT - BLACK FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

RACIAL IMPACT LEVEL

	I	II	III
N	8	13	21
SD	10.2	9.8	10.2
$\bar{X}SS$	54	53	54

TABLE 55

MEAN MATH CONCEPT ACHIEVEMENT - BLACK FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

RACIAL IMPACT LEVEL

	I	II	III
N	8	13	21
SD	10.1	9.7	10.1
$\bar{X}SS$	54	55	53

TABLE 56

MEAN OVERALL ACADEMIC ACHIEVEMENT - WHITE FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

RACIAL IMPACT LEVEL

	I	II	III
N	53	40	19
SD	6.8	6.9	6.9
$\bar{X}SS$	50	50	51

TABLE 57

MEAN MATH CONCEPT ACHIEVEMENT - WHITE FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

RACIAL IMPACT LEVEL

	I	II	III
N	53	40	19
SD	8.6	8.6	8.7
$\bar{X}SS$	49	50	50

TABLE 58

MEAN LANGUAGE MECHANICS ACHIEVEMENT - WHITE FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

RACIAL IMPACT LEVEL

	I	II	III
N	53	39	19
SD	8.6	8.6	8.8
$\bar{X}SS$	51	52	52

TABLE 59

MEAN LANGUAGE USAGE ACHIEVEMENT - WHITE FEMALES
ADJUSTED FOR SOCIOECONOMIC STATUS

RACIAL IMPACT LEVEL

	I	II	III
N	53	38	19
SD	9.3	9.4	9.5
$\bar{X}SS$	51	50	51

APPENDIX A

TABLE 60

MEAN OVERALL ACADEMIC ACHIEVEMENT - BLACK STUDENTS
IN SCHOOL 2-3 YEARS
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	3	1	13
SD	5.5	N.A.	5.2
$\overline{X}$SS	49	51	52

TABLE 61

MEAN OVERALL ACADEMIC ACHIEVEMENT - WHITE STUDENTS
IN SCHOOL 4 to 5 YEARS
ADJUSTED FOR SOCIOECONOMIC STATUS

	RACIAL IMPACT LEVEL		
	I	II	III
N	64	61	28
SD	6.8	6.8	6.9
$\overline{X}$SS	50	50	49

APPENDIX B

ANN ARBOR PUBLIC SCHOOLS

Date of Entry _____

School Name _____

Child's Name | Address (Street, Apt. No., Zip Code) | Phone | Sex | Grade

Birthdate | Birthplace | Years attended present school

Father's Name | Birthdate | Occupation | Name of Employer | Briefly describe occupational duties

Mother's Name | Birthdate | Occupation | Name of Employer | Briefly describe occupational duties

Father's Education:

Last Grade of Elementary or High School Completed	Years College Completed	Highest Degree Earned	Briefly describe any vocational or other type of education. (Please specify years in school and final certificate.)

Mother's Education:

Last Grade of Elementary or High School Completed	Years College Completed	Highest Degree Earned	Briefly describe any vocational or other type of education. (Please specify years in school and final certificate.)

Relationship Code: (Circle letter that applies to family status of child)

A. Natural Parents
B. Natural Father & Stepmother
C. Natural Mother & Stepfather
D. Father Only
E. Mother Only
F. Court-appointed Guardians
G. School Guardian
H. Adopted
I. Married Minor
J. Institution
K. Other

Student Ethnic Status
(Circle Code Number)

1 - American Indian
2 - Caucasian
3 - Spanish Surname
4 - Black
5 - Oriental
6 - Other

Language Spoken in Home: _____

Names of Brothers & Sisters / Birthdate / School or Occupation

Others in Home / Relation / Age / Occupation

Please complete the information and return it to your child's teacher immediately. Thank you for your help.

/mef: 5/4/77

APPENDIX B

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